

Catastrophic Hydropneumothorax as a Presentation of Esophageal Anastomotic Leak: A Case Report

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Abstract

Background: Anastomotic leakage (AL) is one of the most serious complications following esophagectomy, with an incidence of up to 10% and significant associated morbidity and mortality. AL can lead to pleural contamination, empyema, hydropneumothorax, sepsis, and death if not identified promptly. For emergency clinicians, recognizing the early signs of AL in post-esophagectomy patients is critical for timely intervention and improved outcomes. **Case Presentation:** We describe a 59-year-old male who presented to the Emergency Department seven days after partial esophago-gastrectomy with acute respiratory distress, severe right-sided chest pain, and hypoxia. Chest radiography revealed a right-sided hydropneumothorax, and emergent tube thoracostomy drained purulent fluid. Pleural fluid analysis confirmed empyema, and contrast-enhanced CT demonstrated an esophageal anastomotic leak. The patient required endotracheal intubation, intensive care admission, and broad-spectrum antibiotics. Definitive management included endoscopic stenting and endoluminal vacuum therapy, resulting in clinical stabilization. **Conclusion:** This case highlights the importance of maintaining a high index of suspicion for AL in post-esophagectomy patients presenting with pleural collections or respiratory compromise. In the Emergency Department, early recognition, prompt drainage, and resuscitative measures are lifesaving and should precede definitive diagnostic confirmation. A multidisciplinary approach, incorporating minimally invasive therapies such as endoscopic stenting and endoluminal vacuum therapy, offers promising outcomes. For front-line emergency clinicians, vigilance and early intervention remain central to reducing morbidity and mortality from this devastating complication.

Keywords

Anastomotic Leak, Empyema, Hydropneumothorax, Emergency Department,

Tube Thoracostomy

1. Introduction

Anastomotic leakage (AL) is one of the most severe complications after esophagectomy, associated with increased postoperative morbidity and mortality [1]. The Esophagectomy Complications Consensus Group (ECCG) defines AL as a *full-thickness gastrointestinal defect involving the esophagus, anastomosis, staple line, or conduit, regardless of presentation or method of detection* [1].

AL may result in pleural contamination and subsequent empyema, hydropneumothorax, and sepsis. The incidence of AL is reported at around 10%, with cervical anastomoses more prone to leakage than intrathoracic anastomoses [2] [3]. On average, leaks manifest within 10 days postoperatively [4].

We present a case of catastrophic hydropneumothorax secondary to empyema from an esophageal anastomotic leak, emphasizing the role of emergency clinicians in its recognition and acute management.

2. Case Presentation

2.1. Scenario

A 59-year-old man with a background of adenocarcinoma of the gastroesophageal junction presented to the Emergency Department with severe right-sided chest pain, uneasiness, and acute shortness of breath. He had undergone partial esophago-gastrectomy through a lateral thoraco-abdominal approach 7 days earlier, and had been discharged from the same hospital a day prior to presentation. The post-operative period had been uneventful.

2.2. Initial Assessment

On examination, the patient appeared toxic and unwell. His vital signs were notable for a pulse rate of 166 beats per minute, respiratory rate of 38 breaths per minute, blood pressure of 180/90 mm Hg, and oxygen saturation of 88% on supplemental oxygen via a facemask at 6 liters per minute. His exam was remarkable for a grossly reduced air entry over the right side of the chest. A bedside radiograph (**Figure 1**) of the chest showed a right-sided pneumothorax, with haziness over the lower and middle zones, suggestive of a moderate hydropneumothorax.

2.3. Treatment

An emergent tube thoracostomy was performed in the Emergency Department, and 800 ml of thick, milky, off-white pleural fluid was drained (**Figure 2**).

In view of persistent respiratory distress and progressive encephalopathy, a decision was made to electively intubate and mechanically ventilate him, before transferring to the Intensive Care Unit. A central venous catheter was placed in the right internal jugular vein (**Figure 3**).

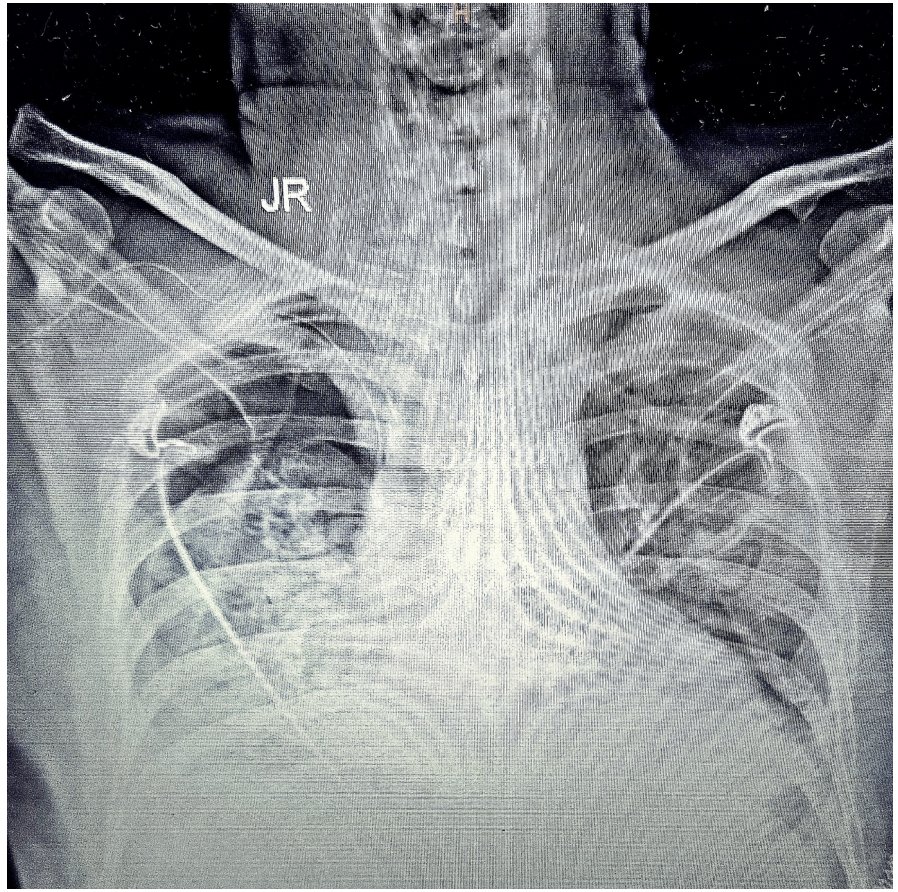


Figure 1. Chest radiograph showing a right-sided hydropneumothorax.



Figure 2. Pleural fluid drained after the emergent tube thoracostomy.

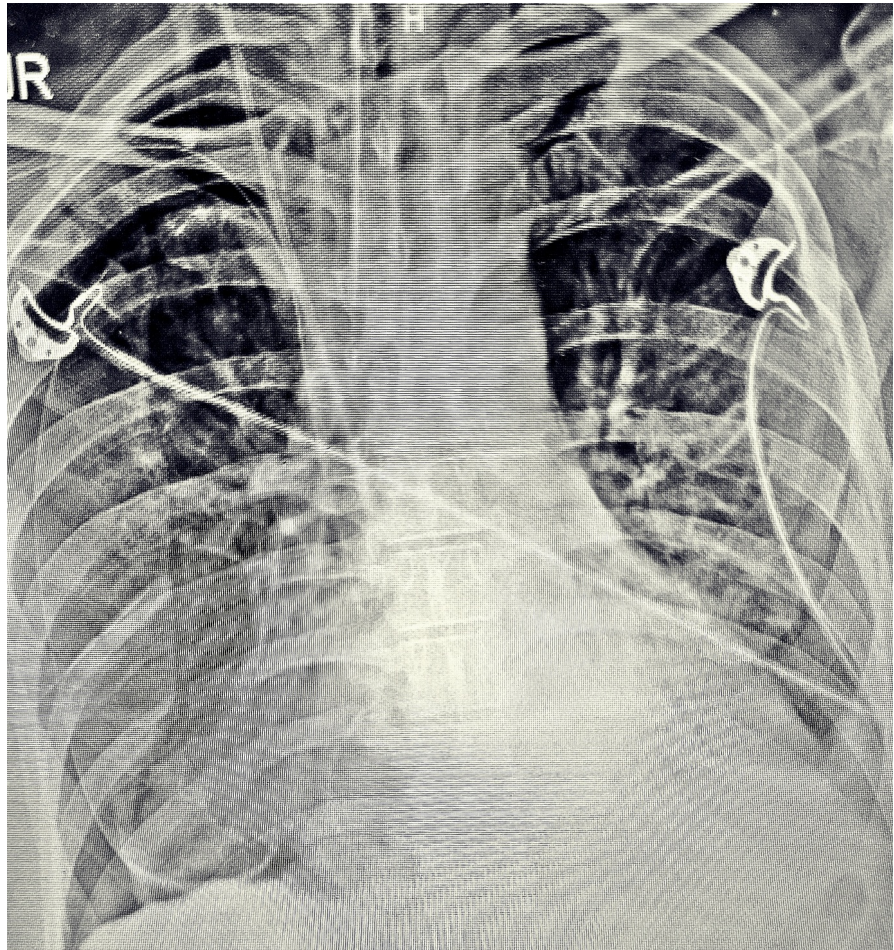


Figure 3. Repeat chest radiograph showing adequately positioned endotracheal tube, right internal jugular central venous catheter, and right-sided intercostal pleural drain. Expansion of the right lung has begun, with persistence of marginal pneumothorax.

At this juncture, there were two potential considerations which might have explained the pleural collection; acute empyema, or chylothorax.

2.4. Follow-Up

Initial laboratory analysis revealed: haemoglobin 11.4 g/dl, white cell count 19,750/L, absolute neutrophil count 16,471 g/dl, and platelet count 440/L. C-reactive protein 136 mg/L, Procalcitonin 1.61 ng/ml. Pleural fluid analysis confirmed pus growing *Escherichia coli*. A computed tomography (CT) scan with enteral contrast via a nasogastric tube showed an anastomotic leak in the lower esophagus. The pleural drain was replaced by a pigtail catheter, resulting in complete evacuation of residual pleural collection. Though the pleural drainage dropped to virtually nil over 72 hours, resulting in the decision to subsequently remove the pigtail catheter, his follow-up contrast scan still showed a persistent leak. Sepsis profile and physiologic parameters had stabilized, with an overall improvement in his clinical condition, seemingly responding to a combination of Meropenem and Teicoplanin.

2.5. Outcome

He was finally taken up for endoscopic esophageal stenting and endoluminal vacuum therapy.

3. Discussion

Anastomotic leak (AL) is among the most feared complications following esophagectomy, carrying reported morbidity rates of up to 60% and mortality rates as high as 35% in severe cases [1] [2]. The Esophagectomy Complications Consensus Group (ECCG) defines AL as a full-thickness gastrointestinal defect involving the esophagus, anastomosis, staple line, or conduit, regardless of presentation or method of detection [1]. The clinical presentation of AL is highly variable, ranging from subclinical leaks detected radiographically to catastrophic sepsis with hemodynamic instability. Our case illustrates a fulminant presentation, with a right-sided hydropneumothorax secondary to empyema that necessitated emergent intervention in the Emergency Department (ED).

3.1. Pathophysiology and Clinical Relevance

The pathogenesis of AL involves ischemia at the anastomotic site, technical factors, tension on the anastomosis, and impaired healing due to malnutrition or comorbidities [2] [5]. It is pertinent to note, that our patient did not exhibit obvious risk factors like malnutrition, obesity, or diabetes for predisposition to a leak. In terms of anastomotic site, our patient had a gastro-esophageal anastomosis, once again making this occurrence rare, considering that cervical anastomoses are more prone to leaks. Once leakage occurs, contamination of the pleural or mediastinal space may lead to empyema, systemic inflammatory response, and septic shock [2] [6]. The risk is greater for intrathoracic anastomoses, although cervical leaks are more common overall [3]. Clinically, early warning signs include tachycardia, fever, respiratory distress, and leucocytosis [5]. Radiographically, a new pleural effusion or infiltrate adjacent to the anastomosis is often the first sign of AL [5] [6]. In our case, the presence of a large hydropneumothorax with purulent drainage was the diagnostic clue.

3.2. Diagnostic Approaches

Early diagnosis remains challenging, as there is no single gold-standard test [2]. Imaging modalities include contrast-enhanced computed tomography (CT), contrast esophagography, and endoscopy. CT with oral or enteral contrast is particularly sensitive, allowing visualization of extravasation and associated collections [4] [6]. In our patient, CT confirmed the leak and guided further intervention. Bedside clinical suspicion, however, remains paramount — particularly in the ED where delays can worsen outcomes.

3.3. Management Strategies

The management of AL depends on the severity of leakage, clinical status, and

available expertise. Initial priorities are resuscitation, broad-spectrum antibiotics, and adequate drainage of pleural or mediastinal collections [2] [5]. Tube thoracostomy, as performed in our patient, is lifesaving in cases of large empyema or hydropneumothorax. Definitive options include endoscopic therapies such as covered self-expanding metal stents and endoluminal vacuum therapy (EVT), both of which promote closure of the defect and control of sepsis (4). EVT has gained increasing popularity, with reported closure rates of up to 90% in selected series, and fewer complications compared with stenting [7] [8].

Surgical re-exploration is reserved for uncontrolled sepsis, conduit necrosis, or failure of less invasive measures [6]. In our patient, endoscopic stenting and EVT facilitated recovery after stabilization with antibiotics and drainage, underscoring the value of a stepwise, multidisciplinary approach.

3.4. Implications for Emergency Medicine

For emergency clinicians, the key learning point is that a patient presenting post-esophagectomy with acute respiratory distress and pleural findings should be presumed to have AL until proven otherwise. Empyema and hydropneumothorax in this context demand urgent drainage and stabilization prior to transfer to specialized care. Timely recognition and intervention in the ED can prevent progression to multi-organ dysfunction and improve survival [2] [5].

4. Conclusions

Anastomotic leak following esophagectomy is a potentially fatal complication that may first present in the Emergency Department. Any new pleural effusion, empyema, or hydropneumothorax in the early postoperative period should raise a strong suspicion of AL. Emergency clinicians play a pivotal role in early recognition, resuscitation, and drainage, which are lifesaving measures prior to definitive intervention.

Contrast-enhanced CT remains the most useful diagnostic tool, but treatment must not be delayed when clinical suspicion is high. Definitive management requires collaboration between emergency medicine, thoracic surgery, gastroenterology, and intensive care teams. Minimally invasive endoscopic techniques such as stenting and EVT provide promising outcomes and are increasingly favoured over reoperation.

Though we acknowledge the limitations of this single-study design, we do suggest future multi-case or registry studies. That being said, for emergency clinicians, vigilance and timely action are crucial in reducing morbidity and mortality from this devastating complication.

Consent

An informed signed consent has been duly obtained from the patient's family. Complete confidentiality and anonymity has been maintained throughout the course of this clinical case report.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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